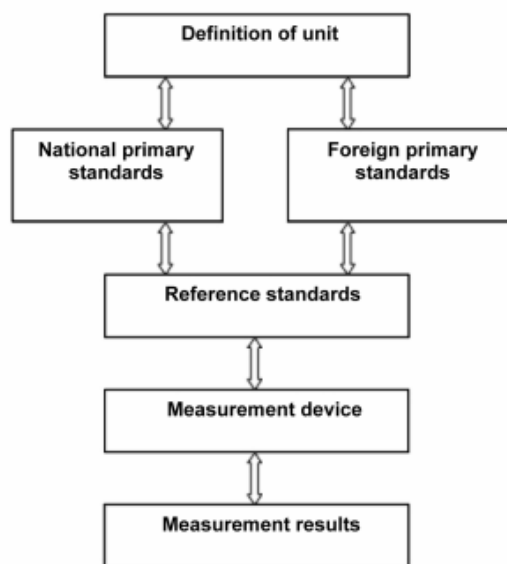


## Are All Traceability Statements Equal?

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Traditionally, if you bought a thermometer that was advertised as “traceable” to a national laboratory (NIST, NPL, PTB, NRC, etc.), you assumed it was calibrated against a standard that was itself calibrated against a better standard that was in turn calibrated against an even better standard and so on until the first instrument in this direct line was calibrated against standards maintained by the national lab. This unbroken chain of calibrations is often referred to as “traceability.”



Typical traceability chain, source: NPL, 2008.

However, many people assume that a thermometer “traceable” to a national lab has the best possible calibration and its accuracy need not be questioned. Some even assume the national lab sanctioned the calibration of the device. Some manufacturers may even advertise their thermometers as “NIST-calibrated” or “NPL-calibrated” when in fact the thermometer has never been to a national lab.

While it may be important to know that a thermometer’s calibration is traceable to a National Laboratory, such a statement may not mean much about the actual calibration and accuracy of that thermometer. In fact, it may not mean that its calibration is traceable at all. According to ISO, traceability is the “property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties.” Unfortunately, the traceability claim is often misused—even in misleading ways.

So let’s look at some things the “national lab-traceable” claim does NOT mean:

1. The national lab only calibrated the first instrument in the chain. Their report only applies to their calibration of that first instrument in the chain. Traceability does not mean the national lab approved the calibration of the thermometer finally in question—nor any of the calibrations below its own in the chain.

2. Application of the term “traceable” is no guarantee that a thermometer has been calibrated correctly, even if the measurements involved in the calibration are indeed traceable. Traceability statements are generally not controlled or regulated, so users are left to themselves to determine the credibility of a traceability claim. Users could go by the reputation of the calibration company or they could decide to audit the company. This means checking the following:

- a. Was the technician performing the calibration properly trained?
- b. Does the organization have carefully prepared, written procedures?
- c. Are those procedures followed? Who checks that and how often?
- d. Are the calibration standards themselves recalibrated at correct intervals? Who decides that and how often?
- e. Were correct estimations of uncertainty applied? Were the uncertainties of the standards sufficiently low to justify the final uncertainty claimed by the unit being calibrated?
- f. Were all elements of uncertainty considered in developing the uncertainty statement?
- g. Does the lab utilize an adequate document control system?
- h. Were correct procedures used to ensure the proper calibration of standards? What methodology is used to verify the performance of these standards between calibrations?
- i. Does the lab have an approved quality control system for calibrations and standards?

The bottom line is this: How do you really know that a so-called “traceable” thermometer is really calibrated correctly and that its calibration is indeed traceable? For years we’ve seen critical industries such as Pharmaceutical, Nuclear and Aviation companies send out auditors to certify the competence of calibration vendors. Not only is this expensive and time-consuming, those audits may not be adequate to prove traceability to a national lab or international standards.

What other options are available? Accredited calibration laboratories have been independently approved by the local accreditation body (UKAS, DKD,

NVLAP etc.) and have demonstrated that each of the issues listed above has been audited for compliance with international standards. Further, the lab is accredited to perform calibrations within the boundaries of a specific scope of capabilities. These boundaries consider the facility, equipment, and personnel of the cal lab. The accreditation applies to specific temperature ranges and types of thermometers and gives specific uncertainty limits.

When you purchase a calibration from an accredited lab, you can be confident that the lab has the competence, equipment, and quality system necessary to deliver the uncertainty level it claims. You can also be confident that its uncertainties have been scrutinized through the entire traceability chain to a national lab or intrinsic standard.

In addition to selecting the type of calibration service you choose throughout the life of your equipment, manufacturers will generally offer a calibration option at time of purchase. A particular instrument may not be manufactured in the same country as it will be deployed, so what does that mean for the end user?

To resolve issues relating to non-domestic accredited calibrations and to remove international trade barriers in 1996 a formal cooperation was founded between international laboratory accreditation bodies to develop a network of mutual recognition agreements. In November 2000 thirty six laboratory accreditation bodies, full members of the International Laboratory Accreditation Cooperation, (ILAC), from 28 economies worldwide signed an arrangement to promote the acceptance of technical test and calibration data.

The arrangement came into effect in 2001 and provides end users a framework of acceptance for accredited calibration data from non-domestic sources. Further information concerning the ILAC agreement can be found on the web page [www.ilac.org](http://www.ilac.org).

If your business provides calibration services, accreditation becomes a competitive edge. Accreditation provides a widely accepted third party assessment of your capabilities. Those labs that respond quickly and offer the best menu of accredited services will capture this fast-growing segment of the calibration market.

Fluke Hart Scientific is a manufacturer and supplier of Temperature calibration products including heat sources, readout devices and probes. Please contact your local Fluke distributor for more details on the range of high performance equipment available.